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The Planting of Home Grounds. Editorial.

Dijon. By Mrs. Schuyler Van Rensselaer.

Populus Monticola. (With figure.) By Professor Sargent.

Drymophilæus olivæformis. (With figure.) By W. Watson.

The paper will contain an illustration of Drymophlæus olivæformis, from a photograph, and one of Populus Monticola, from a drawing by Mr. C. E. Faxon.

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The Value of Rural Beauty.

A RECENT number of *The Press*, published at Ridgefield, Connecticut, contains an account of the settlement of West Mountain, and the narrative carries a lesson which could be profitably studied in many rural communities. The West Mountain district lies a few miles west of Ridgefield. It is a region of wooded heights and deep valleys, and, therefore, of sparkling rivulets and placid lakes, with many picturesque glens and sweeping views of diversified scenery. No doubt, the people who have lived within sight of West Mountain have always enjoyed its beauty, but it was a visitor from the city who was so profoundly impressed with the native charms of the place that he decided to make for himself a summer home in the midst of these sylvan surroundings. The first settler was followed by another and another, and now a single purchaser has secured a large tract with the intention of perpetually preserving it, so that the beauty of these natural hills and woods and lakes can be enjoyed forever. Now, it is a sordid view which estimates rural beauty solely by its money value, but it is worth while to remind the owners of real estate in the country that, even if rural scenery fails to make any moving appeal to their own sense of beauty, there are other people who do prize it. No doubt the purchase of this West Mountain land, which has been idle and practically valueless, will prove a substantial pecuniary advantage to all that neighborhood. Not only will it bring visitors and consumers of home products, but it will enhance the value of all the neighboring real estate, and every landholder thereabout will be the richer because of the discovery and development of this natural beauty, and of the assurance that it is likely to be preserved.

It is encouraging to know that in many other places there is a growing tendency to purchase so-called waste lands and to hold them for the enjoyment of the people. We call to mind another region in Connecticut where the villagers are united in their interest to preserve all the rural charms of the neighborhood. Miles of highway have been purchased with no other purpose than to allow Nature to frolic in her own free way by the road-side. Forests have been bought that they might be held for public enjoyment, and the feeling of the community is strong for the preservation of all wild spots which will help to satisfy the desire for beauty and repose. The state of New Hampshire has considered it worth while to recognize officially the value of its mountain-passes and ravines, its lakes and cascades, and to provide roads and paths for the purpose of making them accessible. All this indicates that every year there are more people who find pleasure and rest in the contemplation of natural beauty, and therefore there is reason for more earnest protest against the wanton marring of that beauty.

Of course, it is not meant that the axe should be kept out of every wood-lot or that every roadside should be left to wild vines and shrubbery. There is a beauty of cultivated fields and road-borders of trimmed turf, as every one will recognize who drives, for example, through the rich farm-lands of Lancaster County, in Pennsylvania. But no community lives up to its duty or highest privilege when it fails in solicitous care for the preservation and enhancement of the natural beauty which is its heritage. The destruction of a few venerable trees may turn a delightful piece of road into a dreary one; a railroad excavation may so gash a mountain-side as to destroy an entrancing prospect, and very often communities have no redress against such inflictions. But, where an alert public sentiment has been cultivated, a community is less likely to suffer in this way, for when it is known that rural beauty is prized as a public possession no one cares to fall under popular disapprobation for defacing it.

But sometimes more than a mere protection against damage ought to be possible. If it is a worthy purpose to conserve, so far as possible, and consistent with the demands of every-day business life, the beauties of a country, the endeavor to multiply and enhance these beauties is equally commendable. There is an art which doth mend nature, and if in all the planning and planting, as well as in all the clearing and general improvement throughout the country, the effect of what is done upon the surrounding scenery is studied—that is, if every proprietor of land should take constant thought about the landscape he is helping to make—the country would steadily grow in attractiveness. If every town possessed a man of taste whose counsel was listened to, village and farm-land, forest and orchard, might gradually shape themselves into pictures upon which the eye would delight to linger. Some one has said that society will not be regenerated by the landscape-gardener; but since a love for natural beauty seems to be an original instinct of the human soul, it certainly is wise to gratify this universal longing and cherish the beauty which lies about us rather than destroy it.

AT the recent meeting of nurserymen at Minneapolis, Mr. C. L. Watrous, of Des Moines, Iowa, took occasion to state a fact which is too often neglected in estimating the adaptability of trees in different regions of the country. What is known as "hardiness" means much more than ability to withstand a certain lowness of temperature. A tree, to be valuable in any situation, must be able not only to endure the cold of its winter, but the heat of its summer, and to endure these extremes for long periods. Besides this, the dryness or dampness of the atmosphere are to be considered as well as the liability to sudden changes in the way of moisture and temperature, with many more climatic complexities. Therefore it is often found that a tree which does fairly well in one situation may perish but a few miles away, and the only safe course is for every section of the country, and no very large section at that, to make its own trials, and find by

actual experience what trees can be planted with hope of success.

The fruit-growers of Iowa began to plant orchards years ago, and their work was full of promise; but disastrous seasons came and the orchards perished. Again they planted hopefully and largely of fruits imported from eastern Europe, where the climate was said to resemble that of our north-west. But here, too, there has been much disappointment, and many persons now believe that profitable orchards in the north-west are not to be found in importations from any different climate.

Some years ago, at a pomological meeting in Boston, there was an exhibition of fruit from every state in the Union, and a member of the Pomological Society from Iowa called attention to the fact that his experience at former exhibitions had been repeated at this one, and he ventured to say that it was always safe to expect that the premium specimens of any variety of fruit would come from a region near by the place of its origin. This statement was not altogether novel, but it impressed Mr. Watrous with the belief that the true way to provide fruits suitable to the north-west was to produce them from seedlings of the native sorts which had already proved themselves adapted to the peculiarities of the north-western climate. This belief is shared by many fruit-growers, and the work of producing native seedling fruits is now carried on with persistence and system in several of the north-western states. Mr. Watrous stated that in Iowa the State Horticultural Society had appropriated $2,500 each year and established twenty experiment stations, where fruits deemed worthy of trial are put under proper tests. Besides this, skilled men are employed to cross-fertilize fruits of various kinds. During the present year many hundreds of crosses have been made upon native Crab-apple trees, some of which already bear fair-sized fruit. The pollen is usually taken from such apples as Jonathan, Grimes, Northern Spy, Baldwin and other large apples of good flavor, late-keeping qualities, and preferably a red color. In the same way pollen is taken from European varieties of the Plum and used upon our native plants. The Sand Hill Cherry from the Dakotas has been planted, and is to be crossed with the best varieties of the European Cherry. The same is done upon our native Currants.

We are not aware that systematic attempts at improving fruits and adapting them to given conditions by cross-breeding has ever been tried on so large a scale in any other part of the world. It is certainly an experiment which all pomologists will look upon with interest. If we can ascertain some of the laws which govern the transmission of the specific qualities of given seed-parents, this would be a marked advance in the science and art of horticulture.

The idea of self-denial for the sake of posterity, of practicing present economy for the sake of debtors yet unborn, of planting forests that our descendants may live under their shade, or of raising cities for future nations to inhabit, never, I suppose, efficiently takes place among publicly recognized motives of exertion. Yet these are not less our duties; nor is our part fitly sustained upon the earth, unless the range of our intended and deliberate usefulness includes, not only the companions but the successors of our pilgrimage. God has lent us the earth for our life; it is a great entail. It belongs as much to those who are to come after us, and whose names are already written in the book of creation, as to us; and we have no right, by anything that we do or neglect, to involve them in unnecessary penalties, or deprive them of benefits which it was in our power to bequeath. And this the more, because it is one of the appointed conditions of the labor of men that, in proportion to the time between the seed-sowing and the harvest, is the fullness of the fruit; and that generally, therefore, the farther off we place our aim, and the less we desire to be ourselves the witnesses of what we have labored for, the more wide and rich will be the measure of our success. Men cannot benefit those that are with them as they can benefit those who come after them; and of all the pulpits from which human voice is ever sent forth, there is none from which it reaches so far as from the grave.—*John Ruskin, The Seven Lamps of Architecture.*

Bronx Park.

FEW people of New York know that within their city limits lies one of the most picturesque spots to be found this side the Adirondacks. Bronx Park is situated beyond the Harlem River, between Williamsbridge and West Farms, in Westchester County, and is about twenty minutes distant from the Grand Central Station. It consists of a strip some two miles long and half a mile wide, mostly wooded, on both banks of the little Bronx River. Altogether it comprises between 600 and 700 acres. In some places the river is a narrow stony brook, and in others widens out into placid sheets of water, surrounded with grassy knolls, shaded by tall, handsome trees. Very peaceful is the scenery, and the visitor finds no suggestion of a neighboring city beyond an occasional glimpse of a gray-coated park watchman and the shrill echoes of frequent steam-whistles.

The park is a portion of the outlying district annexed to New York in 1873, and, beyond taking down most of the old buildings scattered through the tract, nothing has been done toward improving or laying it out. Two or three highways cross it and a few pathways wind along the stream; the rest is left to the care of nature.

The native trees of this region are well represented through the park—Elms, Maples, Beeches, Birches and Chestnuts abound, five or six species of Oak, and, what is most surprising, quite a large grove of sturdy, healthy Hemlocks. Perhaps there are none of very great age, but many are good-sized trees, and what is most encouraging for the future, is the abundance of young ones. The Hemlock grove is the most picturesque part of the park, for there the Bronx winds through a narrow ravine, on the steep rocky sides of which the geologist will invariably point out some astonishing pot-holes. The botanist will not find himself alone in studying the banks of the Bronx; the artist will see many scenes worthy of his pencil, and even the archæologist will find there happy hunting-grounds, for an Indian grave-yard is close at hand.

In the beginning of May the fields and swamps were bright with spring blossoms. Violets were everywhere, white ones and blue ones, the latter going into astonishing vagaries as to color. On the marshy ground the common Blue Violet (*Viola cucullata*) was lilac with a slightly darker spot on the lateral petals; in the woods it was a nearly uniform blue-purple, and on the dry river-banks it was a deep red-purple, very large and handsome. Delicate little lance-leaved Violets (*V. lanceolata*) grow on the edge of the Hemlock-woods with dainty Wind Flowers, which we are now to call *Anemone quinquefolia!* Graceful Uvularias and the sturdy Jack-in-the-Pulpit, the green and the purple-striped form, growing side by side along the marsh and all through the woods, while higher up, in a secluded spot, the bright-green Indian Poke (*Veratrum viride*) is occasionally seen.

On the border of the marsh at Williamsbridge a row of Pin Oaks (*Quercus palustris*), covered with golden-brown tassels, presented a beautiful appearance. The lower branches of the trees almost touched the ground, and, at the water's edge, Sagittarias and their kin were just emerging from their winter sleep.

The pretty little lilac-flowered *Aphyllon uniflorum* was in bloom under the Hemlocks, and along the sandy stretches near the old Lorillard snuff works the curious wild Ginger (*Asarum Canadense*) covered the ground with its blue-green leaves. Witch Hazel grows along the mill-race of the old factory, and the graceful drooping clusters of the Bladder Nut (*Staphylea trifolia*) were reflected in a big pool overshadowed by lofty Hemlocks. The most striking bit of bloom was on the rocky bank near the Fordham road, where rose-colored Pinxter-flowers (*Rhododendron nudiflorum*), Black Haw (*Viburnum prunifolium*) and high, straggling Dogwoods were flowering. The Azalea was abundant and very luxuriant. Among the stones all about it was the pretty Columbine (*Aquilegia Canadensis*) and the wild Pink (*Silene Pennsylvanica*). Of Laurel there were only a few stunted shrubs, which bear the marks of very rough handling.

In 1639 one Jonas Bronck, a Swede, with his wife Antonia, a Dutchwoman, their servants and cattle, sailed from Amsterdam in the "Fire of Troy," and, on his arrival here, "purchased from the Indian sachem, Tackamack, and his associates the large tract of land called by them *Ranachqua*, lying between the Great Kill and the River *Ah-qua-hung*, now the Bronx . . . and since included in the Manor of Morrisania."* There "Seignior Bronck," as he was styled, built a stone house, tobacco-house, etc., and there died in 1643. After his death his estate passed through several hands till, in 1668, one

* "Harlem: Its Origin and Early Annals," by James Riker. New York, 1881.

Samuel Edsall conveyed it to "Colonel Lewis Morris, of the Island of Barbadoes, Merchant." At the death of the latter, in 1691, the whole estate, embracing 1920 acres, fell to his nephew, Lewis Morris, and was, in 1697, erected into the Manor of Morrisania.

Less than a century later, in September, 1776, General Washington established his headquarters, first at the country-seat of Roger Morris, and then at White Plains, his army being entrenched along the Bronx. It was on Chatterton's Hill, writes Washington Irving, that, by his skill displayed in the construction of earth-works, Alexander Hamilton, then a young captain of artillery, first attracted General Washington's notice. Of the battles of those days, along the Bronx, only tradition remains, and as the city extends the old landmarks quickly vanish. Even their names are forgotten in our fashion of neglecting points of historic interest in the nomenclature of city streets and squares.

Bronx Park has been selected as the site of the Botanic Garden which it is hoped the city will one day possess, and a more appropriate site could hardly be imagined. The river furnishes abundant water, and the varied soil and surface offers a rare opportunity for a fair piece of landscape-work.

The accompanying view on Bronx River is from a photograph taken by Mr. Charles G. Wood, junior, at a point below the Hemlock Grove.

New York. *Anna Murray Vail.*

How We Renewed an Old Place.

XII.—TERRACES AND SHRUBS.

THOUGH we have no especial preference for terraces, which used to form a feature of many old-fashioned homes, the conditions of our house-lot have forced them upon us on three sides. As I have before stated, the flat top of the knoll is very limited in extent, so that, even in building, we were forced to cut our coat according to our cloth, and support the rear of the house with a high basement to serve for laundry, dairy, and other offices, instead of adding the more usual L, or wing.

The width of the lot at this point would not allow of more than ninety feet between us and the highway, even by setting the building as far back as possible, and, when this was done, leaving a gentle slope from the front door to the road, the ground on the north and south sides of the house fell with such abruptness from the foundations that no room was left even for a passage-way.

This lack was remedied on the north of the house by constructing a terrace sufficiently wide on top for a tree or two, and some shrubbery to mask the foundations, with plenty of space for climbing things to grow over the veranda. This bank, supported on the east by the heavy wing-wall of the house, slopes to a driveway below, which leads to the stable behind. It is high and steep, but well sodded, and rather adds to the commanding effect of the house, besides serving to break the height of the building at the back. A flight of steps at the rear of the veranda leads to the drive below, and some good-sized Pines have been planted there to still further hide the basement.

The main approach was not planned with sufficient consideration for anything but convenience, and consists of a semi-circular driveway to make the house easily accessible from both ends of the town, but it is our plan to alter it before long, so that the front door will only be accessible from the north to carriages, which will give us an unbroken stretch of grass on the east and south, whereas now there is a half-moon of greensward in front, enclosed between the driveway and the street, thickly planted with trees destined soon to form an effectual screen between us and the dusty road.

South of the house, near the highway, the ground slopes gently into the swale, which, with its groups of trees, forms a side lawn of uneven surface, bounded at the rear by the hill, with its rising tiers of little Pines. Near the dwelling, however, in order to get any greensward or shade at all, we were forced to construct, of stones and gravel, a terrace some twenty-five feet in width at its narrowest part, to support which about two hundred feet or more of massive wall were constructed. This wall is low in front, and buries itself in the grassy slope, but where it curves around the knoll at the rear, it is six feet high, and makes a warm background for Grape-vines, and the hot-beds, which are placed below the vines, fronting the south. A steep bank, thickly sodded, descends from the level of the lawn to the top of the wall, which is also covered with turf. This sunny south terrace is the very spot for the old-fashioned Rose-bushes which we have transplanted hither from the other parts of the place, and here, too, is a bed for more delicate specimens, which can be protected by a glass frame in the winter-time, as well as a tree to shade the south windows from the heat.

The wall was quite an important construction, and I am afraid to say how many tons of stone went into it, for the largest portion of it is underground, the results being very solid and substantial.

Behind the house, on the basement-level, is still another curved terrace, from which a grassy cart-path leads down to the swale and the hot-beds, and here the various walls are utilized to protect rows of Currant-bushes above, and Raspberry-bushes below, which are easy of access from the kitchen-door.

To cover all this expanse of gravel foundation required untold quantities of loam, so much, indeed, that we thought ourselves fortunate if we could allow an average of four inches over the whole surface of the lawn, but this meagre allowance seems to afford sufficient hold for the grass-roots, and heavy annual dressings of compost add continually to its depth. It is rather a curious study to watch the formation of soil, and the gradual way in which the sand below is transformed by the roots—first into yellow, and then into black loam. How long, we wonder, will it take before a foot of soil is obtained over a surface treated as this lawn is treated, the fine grass dropped from the lawn-mower being left upon it without raking, and the drainage from the heavily enriched trees always helping it along, in addition to its own annual dressings?

The shrubs on the knoll, at first scattered about rather promiscuously, as they increase in size we are struggling to group properly, according to the lights thrown upon this subject by GARDEN AND FOREST, but the articles we have so carefully studied on this topic presuppose a great number of bushes of one kind to begin with, and where you have perhaps three Golden Spiræas, and a half-dozen Lilac-bushes, and a hardy Hydrangea or two, and a few Deutzias, and Weigelias, and other heterogeneous things in variety, the question is to set them so that they will produce the effect of twenty-five of each. We have managed it so that really the shrubbery appears rather crowded, but it has been done in a manner to horrify the authorities.

We have treated our landscape very much as a painter would his canvas. We dab in a shrub where we think it will produce the effect of half a dozen, and if, after a few months, the picture seems to require its removal, out it is scratched and dabbed into another spot, and thus, in true amateur fashion, we feel our way toward a final result, for we find things never look when they are little as they do when they are fairly grown,—the usual experience of amateur gardeners.

The best that can be said for this method is, that the results are unconventional. I have discovered that a landscape-gardener gets a style, a mannerism, like a poet or a draftsman, and that, after some experience, you can detect the professional manufacturer of a garden by the receipts on which he works. Twenty-five Spiræas here, twenty Deutzias there, Viburnums one dozen, Lilacs in variety, Forsythias eight, a bushel or two of golden Evergreens mixed with Juniper and Arbor-vitæ, at such a point, a hedge here, curves on this side, straight lines on that, etc., etc.—it is all reduced to a system, and the results, if repeated in the same town, are monotonous.

We are bound, having gone in for it, to defend the natural method. If the results of the artificial are more satisfactory, the execution is not half the fun.

Can there be, I ask you, the same enjoyment in sitting down to watch the growth of a border of shrubs that somebody has set out for you, that there is in dragging the few you have planted yourself, out of their holes and transporting them to a more becoming place, as you would a flower on a bonnet?

Anybody can put in a tree or a shrub and let it alone, but it takes nerve to wheel it about like a baby in a go-cart.

We have neighbors who employ the conventional methods with dazzling results, but, on the whole, we doubt if their vast and imposing plantations give them as much enjoyment as our more personal intercourse with our little family of growing things. We are quite sure that each scrubby little Pine on the hill is dearer to us than a thicket of well-fed trees planted by a nurseryman.

"You will know my children," said the Owl to the Fox, with whom she had made a compact to spare them, "by their being the most beautiful little darlings in the whole world." But when the Fox came to the nest full of big-eyed, long-billed, unfledged frights, he failed to recognize the description, and ate them all up under a misapprehension. *De nobis fabula.*

We are afraid that most people would pronounce in favor of the upholstering of the professional, rather than of our private efforts at lawn-furnishing, but we can recommend our

method on the ground of economy, both of material and of amusement, for there is no reason why this play should not go on forever, like a Wagner opera. It has its surprises too, in the way of some happy effect that you had not imagined, and again, you are horrified at the outcome of some arrangement that seemed felicitous. We have got our own shrubs so beautifully trained now, that they do not mind moving on the first of May, any more than an old New York citizen. Up they come, blossoms and all, and never drop a petal, but go on blooming serenely in their new home as if they had always been there. This spring we had a present from a kind friend of a box of rare and beautiful little shrubs, the very names of which it took a day to look up. We knew they were coming, but not what they were to be, so a bed was prepared for them within easy reach of the hose, and, when they came, they were set out carefully, in the midst of an April snow-storm, and a cold wind, which nipped their poor little half-opened leaves most cruelly.

After they were all arranged, and the weather had moderated sufficiently for one to study the labels, we found that the arrangement would have driven a gardener wild, future trees, a hundred feet high, having been set side by side with burly little shrubs, which at present look much more important than their (to be) stately neighbors. What with snow one day, and burning heat the next, combined with steady dry weather, those shrubs have had a struggle for existence, in which they have been sturdily abetted by their natural protectors. The hose one minute, and newspapers and branches of trees the next, have been called upon to supply the deficiencies of Nature, who has been more than ever capricious during this extraordinary season, and if at the end of the summer they are all well and firmly established, it will prove what care will do to defy the inclemencies of the season. After a year or two they will have acquired the customs of the place sufficiently to be moved where they will make the best show, but before they reach their final resting-place it is possible that they may have several halts by the way. With a ball of earth attached to the roots, traveling does not seem to hurt them much, though no doubt it retards their growth somewhat, which is all the better if they are to be kept in proper proportion to the place, which is not adapted to anything very gigantic.

Of one thing I have become certain in this limited experience of landscape-gardening, and that is, that the pleasure is in the doing, in the vision of the mind, in the ever-expanding hope for the future. When the trees have grown too large to move, and the shrubs are irrevocably rooted, we shall surely be no happier than now, when they are viewed in a halo of imagination.

Hingham, Mass. *M. C. Robbins.*

The Weeds of California—I.

IT might be unnecessary to begin a treatise on Weeds with a definition of the meaning of the word were it not that usage attaches to it two really distinct ideas, having in common only that of a hardy plant that is of no particular use. A weed in one sense bears the reproach of being a persistent invader of the husbandman's realm, difficult to repel; while in another it means simply a hardy plant thriving under difficulties which discourage more useful growths, and therefore obtruding its presence on road-sides and other waste places. It will hardly do to go so far as to attach the opprobrious term to any plant that habitually appears in a place where it is not wanted, despite the analogy of the "dirt" on the goldsmith's apron and the "pay dirt" of the placer miner.

It has not uncommonly been noted, as a matter of surprise, that the troublesome weeds of any country are rarely aborigines thereof. In reality this is probably but one of the phases of the survival of the fittest under natural conditions; for neither road-sides and waste places on the one hand, nor cultivated ground on the other, can be classed among such conditions. In order to become a weed a plant must be placed under unnaturally favorable conditions, unlike those which have naturally concurred toward the secular co-adaptation of plants, soils and climates. We see the converse process in the complete disappearance of native plants that have formed the predominant growth, as, for example, that of the Buffalo Grass (Buchlöë) from the plains of Nebraska and Colorado, not as the result of displacement, but of unsuitable conditions; while the Thistle on the Pampas, and the Guava on the Hawaiian group, are examples of almost complete displacement of native growth by foreign invaders. In California the progress of the invasion by some of the most common weeds can be currently traced as yet in the more remote regions; and the influence of climate in modifying the "weed nature" of a number of well-known plants forms an interesting study.

The broad fact in the premises that first strikes the newcomer in California is that a number of plants that are the subjects of careful culture east of the Rocky Mountains, as well as in Europe, and which quickly succumb when deprived of artificial protection there, are here found among the most persistent and obnoxious weeds; while very many of those that are specially abundant and troublesome in the Atlantic region are conspicuously absent on the Pacific side. Foremost among the former class are the two "Mustards," *Brasica Rapa* and *B. nigra*, respectively known as White Mustard (or Wild Turnip) and Black Mustard; and next to these the common Radish (*Raphanus sativus*, not *R. Raphanistrum* of the European fields). The first-named is most abundant on the borders of the Bay of San Francisco, and occupies not only abandoned fields, but disputes the ground with the cereals to such an extent that it is often difficult to believe that it has not been planted on purpose; and were rapeseed oil as much sought after as of yore California could doubtless lead the world in growing the plant which yields it. The Black Mustard is of more extended prevalence, and both in the coast region and in the great valley takes possession of neglected fields to the exclusion of everything else, growing so tall in rich soils as to hide horse and rider, and forming impenetrable thickets that, like the Thistle of the Pampas, serve as a place of refuge for wild animals. In the Santa Barbara region such Mustard patches are often cut for their seed, which is extremely pungent; but the crop often fails in consequence of the overwhelming attacks of an aphide upon the peduncles and forming pods. Apart from this latter drawback, California could probably also defy competition in Mustard-culture.

The Radish is not quite so overwhelming in its attacks upon cultivated ground; but large patches of its rose-colored flowers often contrast very prettily with the prevailing yellow of the two Brassicas; and the extirpation of its roots, equally tenacious in texture and life, and enduring several years, is no small problem in badly infested fields. Its habit would seem to indicate its derivation from some one of the long varieties of the cultivated plant.

Of cruciferous weeds the Hedge Mustard (*Erysimum officinale*) is somewhat troublesome at times, and the Shepherd's Purse is well acclimated, but hardly obnoxious. Of native crucifers the only one that maintains its place among cultivated crops with some tenacity is the *Tropidocarpum gracile*, which finds improved conditions of existence in the irrigated districts of the upper San Joaquin Valley. Of other cultivated plants that maintain themselves by road-sides and elsewhere in the open country in suitable ground the Celery, Carrot and Fennel are conspicuous. The tall and dense bushes formed by the last-named plant, even on well-trodden road-sides, recall the mention of Fennel-thickets, dreaded as the lurking-places of wild beasts, by travelers in the coast region of Asia Minor. The Fullers Teasel, likewise, has escaped from cultivation, and forms a serious pest in some places.

Of weeds conspicuous on the Atlantic side and almost unknown as such in California, the entire series of Polygonums is perhaps the most striking example, excepting only *P. aviculare*, which is probably more troublesome here than anywhere else, the rainless summers being nowise against its full enjoyment of life, and, in the prevailing absence of summer cultivation, enabling it to develop into gigantic wheel-shaped specimens, as much superior in size to their eastern brethren as are the proverbial California pumpkins. It is, however, a more or less acceptable pasture-plant for cattle during the dry season. By ditches and in meadows a few scattering plants of *Polygonum lapathifolium*, *P. Pennsylvanicum* and a few others are occasionally seen; but they do not maintain themselves and do not spread into the cultivated fields.

Of their near relatives, the Docks, however, there are several that count among the more troublesome invaders. While *Rumex sanguineus* and *R. obtusifolius* are hardly more often seen than are the Polygonums, three others—*R. crispus*, *R. pulcher* and *R. Acetosella*—are common and extremely tenacious of life, sprouting up from their roots, cut by the last cultivation in May, at any time during the dry season, and seeding quickly and abundantly.

Of Amaranths it may in general be said that they flourish in the fields of California as well, or even better, than on the Atlantic side, although somewhat changed in habit. *A. retroflexus*, as troublesome in California vineyards as among the Corn and Potatoes of the prairie states, forms here mostly a flat, wheel-shaped mass, from which the ground-squirrel, stooping down, gathers its winter hoard. *A. albus* maintains very nearly its eastern aspect.

Of Chenopodiums, *C. album* and *C. Bonus-Henricus* are almost, if not quite, as familiar as in the east and in

Europe; *C. vulvaria* likewise is found, but less generally diffused.

Portulaca oleracea, so common and troublesome in eastern and European gardens and fields, has appeared in a few localities, but, although doing well, has made no headway as a troublesome weed. The altered aspect of its fleshy leaves, which become much reduced in size, and almost terete, under conditions of extreme drouth, so that the thick red stems resemble a group of stout, radially disposed worms, suggests a marked adaptation to environments.

The native *Claytonia perfoliata*, although somewhat persistent among the grass in moister ground in spring, hardly maintains itself against regular cultivation, but its pretty relative, the *Calandrinia Menziesii*, does not give up so readily, and may be seen covering the ground in orchards and vineyards in the coast region, forming a beautiful carpet of purple that attracts attention from afar. Its vegetative duration is too short, and its root system too light, to render it troublesome, but the multitude of its shining black seeds render it difficult of extirpation.

University of California. *E. W. Hilgard.*

New or Little-known Plants.

Arbutus Arizonica.

THE Arizona Arbutus has long been a puzzle to the botanists, not many in number, who have seen it growing. Dried specimens, as they appear in herbaria, do not afford characters, except in their narrow leaves, by which to distinguish them readily. Indeed, except in the form of their leaves, several of the American species, in all of which the flowers and fruit are very similar, are not easy to separate in herbaria. The resemblance between the three species which are found in the territory of the United States is so great that Professor Gray at one time considered the Texas tree a mere form of the Pacific coast *A. Menziesii*, from which he did not distinguish our Arizona plant at all ("Syn. Fl. N. A.," ii., i., 27). Afterward he considered the Texas tree to be a variety of the Mexican *A. Xalapensis*, which he called var. *Texana*, and the Arizona tree another form, calling it var. *Arizonica* ("Syn. Fl. N. A.," ed. 2, ii., i., Suppl., 396). The Texas tree, which I have seen growing in several places in western Texas, including Buckley's original station, does not, however, appear distinct in any way from *A. Xalapensis*, as I understand that species after having seen it growing on the mountains near Monterey in Mexico, and in the series of specimens preserved in the herbarium of the Royal Gardens at Kew. As I know it, it is a low, wide-branching tree, with a stout trunk separating near the ground into a number of large, upright-growing stems. Near the ground only the trunk is covered with thick dark brown or nearly black deeply-furrowed bark, the surface of the ridges separating gradually into thin scales. The remainder of the trunk and the branches are covered with the thin, smooth, bright red bark peculiar to all the plants of the genus. The leaves are oval or ovate or rarely lanceolate-oblong, two or three inches long, rather thick and coriaceous, dark green above and sometimes pale on the lower surface. The ovary is pubescent.

The Arizona tree differs from the other species of the genus, as I know them, in the mature bark which covers the trunk and the lower parts of the principal branches, and which is as white as that of our White Oak and deeply furrowed, the ridges being broken by cross-fissures into thick square plates. The leaves are paler and much narrower than those of the Texas tree, although much reliance cannot be placed on the shape of the leaves of Arbutus, as they vary strikingly on the same plant, and even on the same branch. The character of the bark, which was the same on all the trees seen by Dr. Engelmann and myself on the Santa Rita Mountains, and the habit of the tree, which is that of a small Oak, appear sufficient, however, to distinguish this species which, if my views upon it are correct, will have to be called *Arbutus Arizonica*. It is apparently confined to the mountain ranges of southern Arizona; at least, Mr. Pringle has found nothing like it in northern Mexico, although he has been on the lookout there now for several years for all forms of Arbutus.

Arbutus Arizonica (see Fig. 54) is a tree forty or fifty feet in height, with a tall trunk eighteen inches to two feet in diameter, covered with white bark, stout spreading branches forming a rather compact round head, and stout tortuous red branchlets. The leaves are pale, lanceolate, or rarely oblong, two to three inches long and a third to nearly an inch broad, with entire or minutely denticulate margins, and are rounded or gradually contracted at the base into slender-grooved petioles sometimes an inch long. These, like the young shoots, are slightly puberulous when they first appear. The inflorescence is two and a half to three inches long, tomentose, with conspicuous scarious bracts. The flowers are rather smaller than those of *A. Xalapensis*, but otherwise not distinguishable from those of that species, except in their pubescent ovary. The fruit ripens in October, and is a quarter of an inch broad.

Arbutus Arizonica is found on dry gravelly benches and ridges between six thousand and eight thousand feet over the level of the sea, growing with *Quercus grisea*, *Q. Emoryi*, *Q. chrysolepis* and *Pinus ponderosa*, just above the region of *Pinus Chihuahuana* and below that occupied by *Pinus Arizonica*. It appears to have been first noticed by the late Dr. Thurber at the time of the Mexican Boundary Survey. Much later it was collected by Rothrock, Lemmon, Sargent and Engelmann, who first called attention to the character of the bark, Pringle, and Mayr. It grows in a region which is almost unsurpassed on this continent in the variety and interest of the trees which compose its forests—a region which will well repay more detailed study at the hands of botanists than it has yet received.

C. S. S.

Cultural Department.

Stray Notes from the Arnold Arboretum.—III.

SOMETHING was said in the last issue of these notes of the horticultural value of the two arborescent Cornels of eastern America, and now there is something to say in the same connection of some of the shrubby species, among which are to be found at least three or four excellent garden-plants, and possibly more, but nothing is known yet of the behavior of the California species in cultivation.

By far the most beautiful of our shrubby Cornels is *Cornus circinata*. This is a plant of northern woods, in which it grows in rich and in sandy soil or on rocky banks and hill-sides from Nova Scotia to Dakota, and through the hilly and higher parts of the northern states and along the mountains to Virginia. It is not a large plant, and produces rather rigid erect stems rarely reaching the height of ten feet and covered with smooth dotted bark, which is at first pale green and later becomes light brown or purple. The leaves are perhaps the most beautiful thing about this plant; they are large for the leaves of a Cornel—four or five inches long and three inches or more broad—elliptical and long-pointed. The color of the upper surface is yellow-green, while below they are bluish white or steel colored and covered with short soft hairs. The coloring of the leaves of few shrubs is more striking and beautiful. The flowers appear rather early among those of the Cornels and at the very beginning of June; they are produced in rather small, flat cymes, like the flowers of most of our species, and are small and yellowish white. The fruit is more beautiful than the flowers. It is spherical, as large as a pea, bright blue, and very conspicuous for the size of the clusters. It ripens early in the summer. This has always been a favorite plant in the Arboretum, and has been used in considerable numbers through the shrubberies and along the drives. A few years ago it was only the botanists who knew or cared anything about our Cornels and many other native shrubs, but now landscape-gardeners and nurserymen are beginning to find out their value, and Cornels and Viburnums appear in this vicinity not only in public gardens and parks but in small villa gardens as well—a hopeful thing, perhaps, as indicating that garden fashions in this country are working out of the old ruts and that the popular knowledge and appreciation of plants is broadening.

Ten years ago, in this neighborhood at least, the list of shrubs one found in the majority of villa gardens, was a very

short one indeed, all the horticultural efforts of such establishments being devoted to securing during a couple of months in summer a glaring display of tender bedding plants. Now many of these gardens contain large collections of shrubs often tastefully grouped and arranged, while the use of hardy perennials has also increased. It is interesting to trace the influence of the Arboretum in this increase in the popular knowledge of hardy plants and to find that some of the most popular shrubs in the gardens of the northern states were first raised and cultivated in this country by Mr. Dawson a very few years ago.

surface; they are yellow-green above and pale on the lower surface. The flowers make their appearance late in May or in the early days of June, and are produced in rather small, flat and few-flowered clusters. The fruit, which grows rapidly, ripens in July, and is white or lead color, but not very showy or handsome, as the color is dull, and only a few fruits ripen in the clusters. The color of the branches in winter is the most ornamental thing about this shrub. They are bright red purple, especially the portion produced during the previous summer, and make this plant a conspicuous and interesting object. At the season of the year it is stripped of its foliage, and

Fig. 54.—Arbutus Arizonica.—See page 317.

But the remembrance that the Cornels, like so many other native shrubs, were first cultivated in the Arboretum on a large scale has carried us too far away from the consideration of the individual value of the species. Another of the early-flowering Cornels is the so-called Red Osier Dogwood, *Cornus stolonifera*, so named on account of its habit of spreading and multiplying freely by prostrate or subterraneous shoots. By these, if the plant happens to find itself in the deep, rich, wet soil it delights in, it soon forms great broad clusters of graceful branches, six or eight feet tall. The leaves are lanceolate or ovate, and vary considerably in size and shape on different plants, and in the amount of pubescence which clothes their interest and variety in the composition of gardens and shrubberies is often lacking, a plant of this Cornel lights up a whole shrubbery, and makes, when seen against a background of snow, a bright spot upon which the eye delights to rest. No other plant is so well suited to produce this sort of effect, with the exception of an Old World Cornel, closely related to *C. stolonifera*, which shall be mentioned a little later, when we come to speak of the foreign species. *C. stolonifera* is a northern plant, and loves a cold climate and moist soil. It grows in the east, from New Brunswick as far south as the Potomac, and extends along the shores of the Great Lakes far into British America and

ranges southward, on high mountains, to Arizona and New Mexico.

The panicled Cornel is another species which has been planted in the Arboretum in large numbers and with good effect. This, in most works on botany, appears as *C. paniculata*, but Humphrey Marshall's name, *candidissima*, is older, and has been adopted by Professor Coulter in his recent monograph of our Cornels, and it is by this name that the panicled Cornel should be known. It is a good name, as botanical names go, for the flowers, although they are certainly not pure white, are whiter than those of the most of the species. The clusters are loose and convex and often panicled, and are produced in the greatest profusion along the branches, making this the most beautiful of our shrubbery Cornels at the time when it is in flower. The flowers open here about the middle of June, and, late in the summer, are followed by rather showy clusters of white fruit. *C. candidissima* is sometimes almost tree-like in habit and in the height to which it grows. The branches are erect, slender, very numerous, and sometimes nearly twenty feet tall, and are covered with smooth, gray bark and abundantly supplied with narrow, not very large, pointed pale leaves, sometimes green on the two surfaces and sometimes pale below. This plant grows on the banks of streams and in moist situations, where it often forms extensive thickets; it is one of the most common and widely distributed of all our Cornels, being found from Nova Scotia and Florida to Minnesota and Texas. It abounds in the south, where it replaces *C. stolonifera*, and, in some parts of the country, is one of the most common and conspicuous roadside plants where roads cross streams or low wet places. It will thrive, however, in any good garden-soil, and adapts itself to new conditions to which plants in the garden often have to submit.

The Silky Cornell (*C. sericea*) is the last of our species which has been grown in the Arboretum in large numbers. This is a variable plant in general appearance and in the size and coloring of its leaves, and it is not at all improbable that two or more distinct species can be made out from what has been usually considered *C. sericea*. This plant has the merit of flowering at the very end of June and in the early days of July, that is when most shrubs have passed their time of blooming, and the best effects in the shrubberies at the Arboretum at this time are produced by the great masses of this Cornell, which have been used along the drive-ways. The flower-clusters are not large, and the flowers are yellow rather than white; they are produced, however, in the greatest profusion, while the habit of the plant is excellent with its long graceful branches, which, when it is given sufficient room in which to grow, spread out over the ground and form great masses of foliage fifteen feet or more across. The foliage is almost orange-colored in some forms and pale in others, and the leaves, like the slender, graceful purple branchlets, are covered with soft silky hairs. *C. sericea* likes moist soil, and shows its greatest beauty when planted in such a position that it can hang its long graceful branches over a brook or decorate the margins of a pool. It flourishes, too, if it happens to be planted in dry soil, although, unless the conditions favor it, it will not show its greatest beauty.

C. asperifolia, another native species peculiar to the central and southern parts of the country, is grown in the Arboretum, but not in large numbers, and enough is not known about this plant in cultivation to make it desirable to say much about it as a garden-plant. It is a tall, erect-growing and rather distinct-looking shrub, with reddish brown branchlets, narrow leaves, small flowers and showy white fruit produced in red-stemmed clusters. It is a hardy plant, but not distinct enough to be very valuable probably in the garden, except as a curiosity, or worth planting on a large scale if the other and better-known species can be obtained.

These notes have reached the limit the editor has set for their length, and the consideration of some exotic Cornels must be postponed for another issue of the series.

Arnold Arboretum. *P. C.*

Notes from the Harvard Botanic Garden.

ANEMONE SYLVESTRIS.—The "Wood Anemone," or "Snowdrop Windflower" (the latter name given on account of the drooping habit of the flower-buds and flowers), is one of the most useful and beautiful of the spring-flowering Anemones. It is a native of continental Europe, and has long been cultivated in British gardens. The shining green, ternate leaves are borne on slender petioles, which proceed from the root and are from five to seven inches in length. The divisions of the leaves are cleft and serrate. The pure white flowers, one and a half inches across, with broadly elliptical petals slightly incurved, and a cushion of greenish white pistils encircled by a showy band of bright yellow stamens, are borne singly at the top of a slender, but erect, stem, which often exceeds a foot in height. The leaves of the involucre are borne on stout stems from one to two inches in length, and, although smaller, they bear a strong resemblance to the root-leaves. The plant blooms very freely in May and June, and the flowers are effective, and, for Anemones, last well when cut. It is an excellent plant for the herbaceous border, but is seen to the greatest advantage when planted in clumps on the outskirts of shrubberies or naturalized in irregular patches in shady groves or "wilderness gardens." It will grow in any ordinary soil, but does best in rich loam. The roots are easily divided in autumn, and the plant can be propagated in this way. Seeds ripen freely in this climate, and they are ready for gathering about the latter part of June or early in July, and may be sown immediately with advantage.

CLEMATIS RECTA.—Among hardy plants, this herbaceous species ranks with the best for garden decoration. It is native in various districts of south Europe, and was first introduced to English gardens from Austria in 1597. A variety peculiar to Spain, *C. recta*, var. *Hispanica*, differs but little from the type, and was introduced in 1800. The species is a plant from four to five feet high, forming a compact mass of growth, the stems terminating with a large, much-branched cluster of small creamy-white flowers, fragrant and packed together in close order. Large, established plants are very effective at the back of an herbaceous border among such things as the Oriental Poppy, *Thermopsis Caroliniana*, *Baptisia tinctoria*, the tall-growing Delphiniums and *Achillea filipendula*, var. *filicifolia*, throughout the month of June. *C. recta* seems to thrive better and flower more freely in a soil of medium fertility. It will live in partially shaded situations, but the most luxuriant plants are found in full sunshine. Old plants should not be disturbed so long as they remain in a healthy condition; and while propagation may be effected by dividing them, it will be found more satisfactory, if a trifle slower, to increase the stock by seed, which is borne abundantly.

CORYDALIS NOBILIS.—This is a charming plant for shady positions in the rock-garden and mixed border. The erect, angular stems grow to a height of twelve or eighteen inches, and are furnished with glaucous, bipinnate leaves, which have a very elegant appearance. The flowers are clustered in a dense terminal raceme, and an acute green bract appears at the base of each pedicel. The two outer petals gape, and are of a showy yellow color at the tip, while the other two are smaller, tipped deep brown, and united so as to form a covering for the reproductive organs. The petals terminate at the base with a hollow spur of greenish white. It is to this spur that the generic name refers. The plant is a member of the Fumitory family, and Corydalis is derived from the Greek name for the lark. The spur of the flower, it was imagined, bore some resemblance to that of the lark. This plant flowers profusely in May, and it delights in a free rich loam. When planting in the rock-garden avoid dry positions; they are dangerous, and not infrequently the cause of death. *C. nobilis* is a native of Siberia, and was introduced by a Mr. John Græfer in 1783. Propagated chiefly by division, but it may also be readily increased from seeds when they are obtainable.

HEUCHERA SANGUINEA.—A little tuft of this "Alum Root," which was risked to all the rigors of the late winter, is now in full bloom. This fact, taken with the notes of other cultivators in various parts of the north-east, proves that this excellent plant is, beyond all doubt, hardy as far north as Boston at least. Few plants of recent introduction have attracted such wide-spread attention, and the number of those as well worthy of cultivation is still smaller. It was introduced from Mexico about ten years ago, and the exertions of propagators were rewarded by rapid distribution in Europe. The demand for the plant is still strong across the ocean, and it now finds a ready sale in this country. The uncertainty as to its hardiness was the principal cause of the neglect which it has hitherto suffered from American growers of hardy plants, but it is likely to receive ample attention in future. The plant forms a close mass of pale green lobed leaves, the entire cluster of foliage being about eight or nine inches high. The erect, loose panicles of bright salmon-red flowers attain a height of from eighteen to twenty-four inches, and are produced in large quantity. When in bloom, in established masses, the plant is a never-failing source of gratification. There are, at the present time, many more striking hardy plants in bloom, but certainly none more pleasing. This Heuchera thrives best in a

light and moderately rich soil. The best situation is one where the roots will be moderately dry in winter, and which affords moisture and partial shade in summer. Propagate by dividing the plants early in the season before growth commences.

Ranunculus aconitifolius.—This is a native of Europe, and was introduced in 1596. It is a hardy herbaceous perennial, from twelve to eighteen inches high, and of profuse branching habit. The flowers are small, white and single, but they appear in great abundance. It is seldom found in gardens, but the variety known as *R. aconitifolius flore pleno* is a popular plant. This was introduced about the same time as the species, according to Loudon, but Gerard informs us that it was not known to be wild anywhere in his time. At all events, it has long been a favorite among hardy border plants, and is invariably met with in those rare old-fashioned gardens kept by really old-fashioned people in parts of England and Ireland. They would hardly know it by such a name as *R. aconitifolius*, however, being satisfied with such simple names as "Bachelors' Buttons" and "Fair Maids of France."

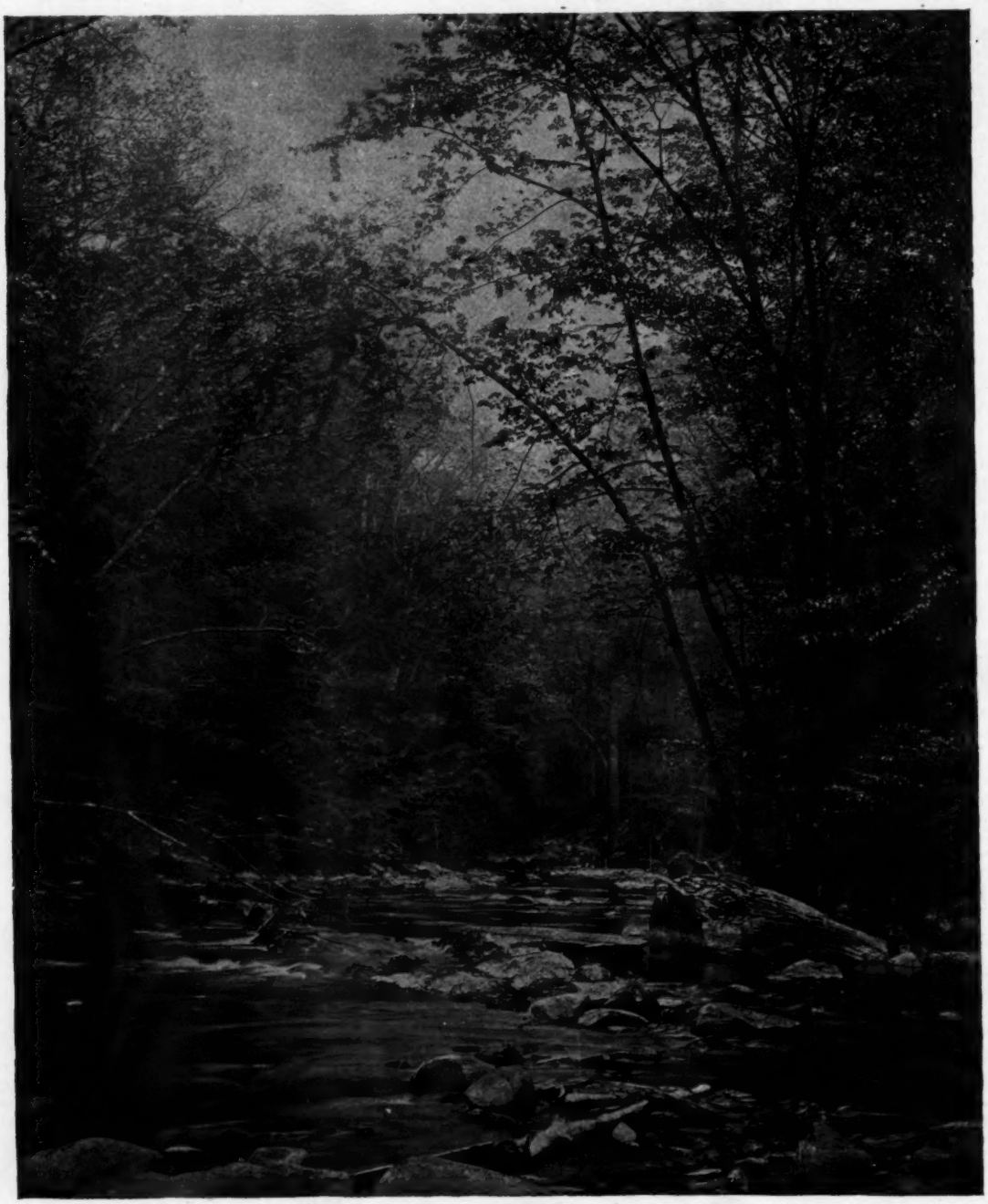

Fig. 55.—A View in Bronx Park, New York.—See page 314.

Masses, about a yard across, intermixed with similar masses of other plants, are more effective than those of larger dimensions. Occasional clumps on the verge of a shrubbery have a pleasing effect, and the flowers are among the best that can be used for cutting.

Cambridge, Mass. *M. Barker.*

Carnivorous Plants.

CEPHALOTUS FOLLICULARIS.—This new Holland Pitcher-plant, though by no means new, is infrequently seen. It is perhaps the oddest member of the Saxifrage family, because it produces leaves of two very different forms on the same plant, some being simply elliptical and flat, while the others consist of tiny pitchers very similar in shape to those borne by some of the Nepenthes. The pitcher-leaves are usually from one to two inches in length and are produced on short stout stems, the color, which varies widely in different plants, being green, much marked and shaded with brownish red or chocolate. The total height of the leaves is seldom more than three inches, although the flower-spike, if permitted to develop, is a few inches higher. The flowers, however, possess comparatively little beauty, and their development is not recommended, because they weaken the growth of the plant, and the pitchers, its chief beauty, are therefore apt to be smaller.

Cephalotus follicularis is the only species of the genus, and is a cool-house plant which delights in moderate shade and abundant moisture. It grows well in a soil of rough peat, sand and living sphagnum, and the pitchers nestle in the moss. A moist atmosphere is so congenial to it that it will thrive under a bell-glass. The propagation of Cephalotus is effected by division of the crowns, by seeds, and also by means of root-cuttings, the latter being probably the most satisfactory method, providing proper care be taken of the cuttings. This plant was introduced from Australia some seventy years ago.

DIONÆA MUSCIPULA.—As a companion plant to the Cephalotus, the Venus Fly-trap, or Dionæa, is very interesting, and the two plants will give an opportunity, in a small space, for the study of so-called carnivorous plants, and both are charming little plants, without taking into consideration their digestive possibilities. The Dionæa will flourish under the treatment recommended for the Cephalotus, and, like the latter, it is benefited by the removal of the flower-stems before they are fully developed. Dionæa is also a monotypic genus, and is found in swampy ground in a few localities near the Atlantic coast, in North and South Carolina.

Further interest may be added to the collection by the addition of some of the Sundews (Droseras), to which Dionæa is allied. Among the native species *D. rotundifolia* and *D. filiformis* are the prettiest, while, among the many species of foreign origin, *D. binata* and *D. spathulata* are notably good, and deserving of cultivation.

All of these plants may be grown in quite small pots—a good plan being to plunge several pots in a pan of moss or sand, by which means it is easier to keep them moist during hot weather.

Holmesburg, Pa. *W. H. Taplin.*

Garden Edgings.—Four days before Mr. Gerard's article on this subject appeared in GARDEN AND FOREST (page 298), the *Gardeners'* (London) *Magazine* contained the following note: "Many kinds of edgings may be put down in gardens to divide beds or margin walks, although the man who only uses tiles and brickbats thinks that plants should not come into consideration. The perpetual use of Box, clipped into painful regularity, is almost as tiresome as glazed tiles; but I allow of none of these in my own case. One long walk is edged with Gentianella, which has formed a perfect mat-like growth, enriched with the profound blue flowers; another formed of Saxifrage, and the others of Stonecrop, Arabis, or lovely herbs of dwarf growth. One of the principal walks is margined with soft stones, having Stonecrop, Saxifrage, etc., planted between delightful rock things that soon cover the stone with a velvety carpet, studded in spring by flowers. The Armeria deserves a special note. It is one of the best edging plants that may be used, growing luxuriantly, and presenting at this season a surface of rosy flowers, rising up with great regularity. The Thrift, or Armeria, remains green throughout the year, but needs attention about once in two years, when the whole should be lifted, the tufts divided, and replanted in light loamy soil, well mixed with silver sand. Visitors here think the edgings of Thrift worth a journey to see, and I send this note in the hope that those who have not tried it, or the other kinds of edging mentioned, will do so."

Spiræa gigantea, said to be a variety of *Spiræa Kamtschatica*, is a plant of noble port, with very large palmate leaves on stout erect stems. The flowers, which are produced freely in large racemes, are attractive and, on first opening, of a creamy tint, changing to a pure white. In rich, deep, wet soil it is said to grow seven or eight feet high, but on the border of my tank, in somewhat heavy soil, it flowered about the middle of June when five feet high. It promises to be a good plant to establish on the margin of water where a bold effect is desired, since it is distinct and larger in all its parts than our common Meadowsweet. Like most of the herbaceous Spiræas it soon turns rusty after flowering, so that it is not a desirable plant for a small garden or prominent location.

Elizabeth, N. J. *J. N. Gerard.*

Correspondence.

The Naturalization of Exotic Forest-trees in Prussia.

To the Editor of GARDEN AND FOREST:

Sir,—Ten years have now passed since the Prussian Government undertook the cultivation, on a large scale, of a considerable number of exotic forest-trees, principally American, with a few also from Japan. This period, although a short one in comparison with the life of individual trees, seems to have satisfied the authorities, in a certain degree at least, as to the feasibility of the undertaking. There is nothing novel in this experiment, because similar ones were made here during the last century; but in our age more persistency and method are used in carrying out such trials. Americans who take a friendly interest in their vegetable compatriots in a foreign country will be glad to hear, perhaps, of some of the results which have been obtained with them in this country. It is safe to say in general terms that this new departure in German sylviculture has been successful. The success is due principally to Mr. Lucius de Ballhausen, late Minister of the Interior, seconded by Forest-master Danckelman, of the Academy of Neustadt Eberswalde.

The list of species tried at first was large, but has now been greatly reduced, and only includes those trees which seem to be the most promising, the forest-administration being determined to confine itself to testing thoroughly only the most valuable trees which up to the present time have proved themselves best suited to flourish in the climate of northern Germany; and in the future these species only will be cultivated on a large scale. The purpose of this note is to give some information with regard to these trees gathered from recent publications of the Forest Academy, the most important of these being a pamphlet from the pen of Professor A. Schwappach, entitled, "Denkschrift betreffend die Ergebnisse der in den Jahren 1881-90 in den Preussischen Staatsforsten ausgeführten Anbauversuche mit fremdländischen Holzarten."

The department, between 1881 and 1890, distributed an immense quantity of the seeds of trees furnished almost entirely by our distinguished countryman, Mr. John Booth, formerly proprietor of the celebrated nurseries at Flottbeck. The appropriation for the purchase of seeds being now exhausted, efforts will be confined for the present to a study of the growing plantations. These are considerable, and occupy in the forests of the state alone a surface of ten or twelve hundred acres. Experiments have been made with twenty-two American and six Japanese species, as well as with *Pinus Laricio* of Corsica and Nordmann's Fir of the Caucasus. The experiments will be continued on a large scale in future with the following selected species only: *Pseudotsuga taxifolia, Picea Sitchensis, Chamæcyparis Lawsoniana, Thuya gigantea, Quercus rubra, Juglans nigra, Hicoria ovata, Hicoria minima.*

A second class, composed of trees which promise only a partial success, is reserved for less extended trials. It is composed of the following: *Pinus rigida, Juniperus Virginiana, Abies Nordmanniana, Pinus Laricio, Acer barbatum, Betula lenta, Hicoria alba, Hicoria porcina.* The following trees have been rejected entirely: *Pinus Jeffreyi* and *P. ponderosa, Acer saccharinum* (*dasycarpum*), *A. macrophyllum, Hicoria sulcata, Fraxinus pubescens.* In place of the last it is now proposed to try *Fraxinus Americana.*

Of all the new introductions which, as you have noticed, consist principally of conifers, the Douglas Spruce appears destined to occupy the first place. Nothing but praise is heard for it. The seed of none of the other exotic trees has been distributed so generally and so profusely in all parts of the country, from the north to the south, and none of the others has given such brilliant results. Immense quantities of the seed of this tree are now planted in all parts of Germany, and the supply is not commensurate with the demand. This splendid tree, therefore, has the best chance, if not of replacing our indigenous conifers, at least of placing itself on a par with them in the composition of our forests. Its success seems to be assured in all parts of the kingdom, even in the provinces of the north-east, where the cold is extreme. Not particular as

to soil, it thrives everywhere except in low peaty swamps and on the moving sands of our maritime provinces. The Douglas Fir is one of the best presents which have been made by the New World to Europe. The publication to which I have referred devotes itself especially to discussing the differences between the so-called Red and Yellow Firs, races which seem to mingle in this country in the general success of the species.

The Douglas Fir has for a close second the Sitka Spruce, which is also very promising, although it grows less rapidly than the Fir; and we expect to see this tree of the Pacific coast occupying some day or other immense tracts of the German forests, especially in those peaty soils where the Douglas Fir refuses to flourish.

Lawson's Cypress, that ornament of gardens, is valued for the solidity of its wood and for the ease with which it adapts itself to soils of the most variable character. What I think will surprise you is the hardiness of *Thuya gigantea* in the extreme north, even to the very confines of that eastern Prussia which at Berlin has come to be considered the vestibule of Siberia. It is needless to say that, as it flourishes in that inhospitable region, the parks and gardens of Brandebourg, in a more temperate climate, are now enriched with the tall stems of this superb plant, which passes uninjured our most severe winters. Even this last one of abnormal severity and length has not affected it in the least.

Pinus Jeffreyi and *P. ponderosa* have been struck out from the list of trees available for planting in the neighborhood of Berlin, although there is still some hope that *Pinus rigida* may succeed here, this being the species which was believed to furnish the pitch pine of commerce, which is, however, probably produced by *Pinus mitis* or by *P. palustris*. That this communication may not be too long, I must not speak in detail of all the species which have been tried. The Black Walnut and the Hickories rarely find here soil suited to their needs, while the Red Oak succeeds admirably. This last, however, has been naturalized here for a long time, its introduction dating from 1740. Up to the present time, however, it has been grown as an ornament of gardens, and not as an inhabitant of forests.

I cannot leave this subject without expressing my thanks to Mr. Schwappach for his admirable essay upon the results of these forest-experiments. I shall take an early occasion to speak of the results of the experiments with Japanese trees in Prussian forest-planting.

Berlin. *C. Bolle.*

Irish Daffodils versus Dutch in the New Country.

To the Editor of Garden and Forest:

Sir,—I was pleased to see what is said about the successful cultivation of Daffodils in Garden and Forest. I should add, as a European and one who grows bulbs by the thousand, do not depend for bloom on rich, over-fed bulbs that look plump and heavy. Rather select smaller bulbs that are properly ripened, with flower-buds well set in them. Where there is a lot of green unripe wood on a plant, it means a lack of flowers. Where there is a lot of dense foliage on a Daffodil-bulb produced by over-feeding, the same rule holds good. The overfed bulb never gets properly ripened. It keeps growing, making leaves instead of bloom, and when it settles down to rest is too often dug from necessity in a thoroughly green state. This applies to Daffodils such as Trumpet Major, Trumpet Maximus, Spurius; with Bicolor Horsfieldi, Emperor, Empress, Sir Watkin, etc., that produce large broad leaves, the larger the bulbs and better fed they are the better. But with all the Spurius class, Princess, Trumpet Major, Von Sion, etc., the hard, dry, well-matured bulbs, grown without stimulants of any sort, are best. For experiment I procured four bulbs of Princess from Holland, which were beautiful to look at. In fact, they were originally Irish bulbs, grown three years in Holland. I planted them side by side with small bulbs of the same stock grown in Ireland. The result was one flower each on the fat Irish bulbs, pampered by a Dutch expert for three years, and two and three blooms each on smaller-looking stuff kept and grown on in their native soil. Holland can grow Tulips, Hyacinths, Crocus, Anemones and Ranunculus better than any nation in Europe; it never can grow ordinary Daffodils with the south of England or Ireland. It has not the soil. Sand answers well. But to grow Daffodils to perfection you must have the command of good hazel loam and ample drainage during the resting period.

The crop of bloom does not come in Holland until April. In the south of Ireland the flowering season is late February and March. If bulbs flower early under good conditions they ripen early, can be planted early, and will bloom early.

Cork, Ireland. *John Quill.*

Recent Publications.

A Manual of Forestry, Volume II. *Formation and Tending of Woods, or Practical Sylviculture.* By William Schlich. London: Bradbury, Agnew & Co., 1891.

The first volume of this manual appeared in the autumn of 1889 and was reviewed at length in these columns by Sir Dietrich Brandis, the former head of the Indian Forestry Department. That volume dealt with the question of the general utility of forests, and, in part, with the fundamental principles of sylviculture. The present volume describes the practical application of those principles, with a description of various trees, with special reference to their adaptability and value for cultivation in Great Britain. Practical sylviculture, as Mr. Schlich defines it, is the production of woods or forests—that is, all the operations connected with the formation and care of woods until the trees which compose them are ripe for the axe. The principles which guide the forester in this business were explained in the first volume of this manual, and all that is left for the author to accomplish in the present installment of this important work is to explain the practical application. The subject he divides into their following chapters:

Preliminary Works, under which head Dr. Schlich treats of the choice of species, the question of fencing, and the preparation and reclamation of the soil. In his second chapter he treats of the formation of woods either by artificial or natural means. The third chapter is devoted to the care of the woods after they are planted, while in his fourth chapter the author sketches in the form of notes the economic value of various forest-trees.

Mr. Schlich very properly points out that the success of all forestry operations depends primarily upon the judicious selection of the species of tree which is to be grown under a given set of conditions; and this, we may remark, applies not only to forests planted primarily for the production of timber, but to all plantations for whatever purpose they may be made. Mistakes made in the selection of species to be planted can be rectified only after a considerable lapse of time. Many species, as we know to our cost in this country, where we are only just beginning to learn that the Norway Spruce and the Scotch and Austrian Pines are worthless here, thrive well for a series of years, and only commence to fail after twenty, thirty, or even after a longer period. The entire success of any species in any given locality is dependent on many things besides hardiness. A species possesses greater or less value in proportion as it can be adapted to desired systems of sylviculture, as it may possess, in a greater or less degree, power to preserve or improve the fertility of soil and capacity to resist damage from external causes. Not only must the value of the products of any species have its proper weight in causing the selection of trees to be planted on a large scale, but the matter of the improvement of the soil through planting is one of vital importance which cannot safely be overlooked, as in it lies the germ of the whole theory of profitable sylviculture. Unless land which is covered with trees improves from year to year and from century to century by the action of these trees, some mistake has been made in their selection, and any system of sylviculture which does not improve the condition of the soil has not been wisely selected and developed.

In the chapter on the formation of woods, directions are given for sowing, for selecting and testing seeds, for the formation and management of germinating or seed beds, for methods of sowing, whether broadcast or in patches, or in trenches or pits. The section which treats of the quality of the plants we are glad to reproduce entire, because there is no department of planting in which planters in this country so often fail as they do in this particular.

"The success of planting operations," the author tells us, "is governed by the quality of the plants which are used, just as the success of direct sowings depends on the quality of the seeds. Hence only healthy vigorous plants should be used, which are likely to bear well the interruption of growth involved in the transfer from one locality to another under circumstances admitting only of a limited amount of attention being paid to each plant. The vigor or growing power of a plant is indicated by a normal shape and a healthy appearance.

"The development of each part must be in due proportion to the rest; the plants should be neither tall and thin, nor too short and stout; nor should the stem be crooked, especially in the case of coniferous plants; the root system should be ample, with a fully developed system of rootlets; the crown should have a healthy green appearance and possess numerous well-developed buds. These are the general characteristics of good healthy plants."

These sentences may well be read by many persons in this country who have charge of planting our public parks, in which it often happens that crooked, distorted and half-dead trees and worthless shrubs are set. Such plants never produce desirable results. The cheapest and best thing to do with such plants is to put them on a brush pile. It is certainly a waste of money to plant and cultivate them. There is no branch of American horticulture which now needs reform so much as in the quality of nursery-grown ornamental trees and shrubs as usually offered for sale. Nurserymen, of course, will continue to sell poorly grown plants as long as purchasers can be found for them, and a reform in this direction will not come until purchasers know what a good plant is, and what it is worth. When this time comes they will be willing to pay what it costs to produce a well-grown, well-rooted and well-pruned shapely plant. The character of the material which is being planted in some of our cities under the direction of park commissioners and landscape-gardeners is not a credit to the existing knowledge of tree-planting in this country, and we are glad of the support of so eminent an author as Dr. Schlich on this subject, which is one of very considerable importance, as a bad tree, once planted, will, unless it has the good fortune to die, continue bad until the end of its life and remain a daily proof of bad methods.

We are glad to quote, too, the sentence that, "as a general rule, young plants are best because the operation of planting is cheaper. The plants survive more easily the interruption of growth involved in the change, and they adapt themselves more readily to new conditions." These are sound arguments against the prevailing notion that it is better to plant large plants than small ones.

Persons who desire to plant on a large scale will find in this work a detailed account of all the methods necessary to follow in planting forest-trees in the most economical manner, with descriptions of the tools used, and such other information as will enable them to carry out sylvicultural operations successfully. They will find, too, a clear account of the systems employed in Europe in renewing woods by the natural process, with suggestions for the application of these rules in particular cases. We should be glad to describe these methods more in detail, but the want of space compels us to refer the reader interested in such subjects to the book itself, which has the exceeding merit of being written in plain and simple English, and in a style which makes it perfectly easy to understand some of the rather complicated operations of which it treats.

Sylvicultural notes on British forest-trees, which occupies the fourth and concluding chapter, is devoted to an account of the native trees of Great Britain, with a description of the material they produce, their distribution, with notes on the climates and soils in which they flourish, together with an account of the best systems for cultivating them profitably; and, in convenient form, much useful information upon the diseases and other dangers which threaten them. The only foreign tree included in the list is the Douglas Fir of western North America, a tree of which numerous experimental plantations have been established in Great Britain and Germany, some of them upward of thirty years old.

The last *Bulletin of the Cornell Experiment Station* is devoted to the winter forcing of Tomatoes, which has become a prosperous business in the vicinity of our large cities. The most essential points in cultural practice may be summarized as follows: A Tomato-house should be very light and warm, and the roof should be at least five feet above the beds or benches. An abundance of sunlight is essential, and the temperature should be about sixty to sixty-five degrees at night and seventy to eighty degrees during the day, or higher in full sunshine. House-Tomatoes demand a rich soil and a liberal supply of fertilizers, and they will bear when four to five months old. They like brisk bottom heat and may be grown in large boxes or upon benches; eighteen-inch square boxes, placed a foot apart, and containing four plants to the box, afford one of the neatest and best means of growing Tomatoes. Winter Tomatoes must be trained. From one to three stems, depending upon the distance apart of the plants, are allowed to grow from each. These are trained upon perpendicular or ascending cords, and they must be pruned as fast as new shoots appear. The heaviest clusters should be supported. Water may be used more freely early in the growth of the plant than later. Wet the soil thoroughly at each watering rather than water often. When the fruit begins to set, keep the atmosphere dry, especially during the middle of the day.

House-Tomatoes in this latitude yield about two pounds to the square foot. The amount of the first crop does not appear to influence the amount of yield in the second crop from the same plant. Lorillard, Ignotum, Volunteer, Ithaca, Golden Queen and Beauty have been found good winter varieties. Insect pests are kept in check by fumigating with tobacco, and the spotted mite by Hughes' fir-tree oil. Fungi are controlled by ammoniacal carbonate of copper and Bordeaux mixture.

The most interesting passage in the bulletin is that which relates to the necessity of aiding nature in the work of pollination. Some account of experiments on this point was given in GARDEN AND FOREST while they were being carried on, but the subject is of sufficient importance to be referred to again. When the flowers appear, the atmosphere is kept dry during the brighter part of the day, when the pollen is discharged most profusely, but in the short, dull days of midwinter the flowers must be helped, or the fruit will not set. The common practice of tapping the plants in the middle of the day with a padded stick may be better than nothing at all, although some tests of the value of this operation showed indifferent results. The most expeditious and satisfactory method which has been used is to knock the pollen from the flowers, catch it in a spoon or other receptacle, and then dip the stigmas of the same or other flowers into it. There is a proper time in the life of a flower when the pollen falls out readily if the atmosphere is dry enough. This is when the flower is fully expanded and somewhat past its prime. If the flower is then tapped lightly with a lead-pencil the yellow powder falls out freely.

But there is additional reason for hand pollination. In-door Tomatoes are smaller than those grown out-of-doors, and midwinter fruits are smaller usually than those produced in late spring. There is also a tendency in house-grown Tomatoes to be one-sided, and Professor Bailey concluded that, although the lack of sunlight had something to do with inferior size, this lack of symmetry, and perhaps the smallness, too, were due to irregular and insufficient pollination. As an experiment two fruits upon one cluster were pollinated from the same source. In one case very little pollen was used, and it was applied to one side of the stigma only, while the other flowers received abundant pollen over the whole stigmatic surface. A picture of the fruits which resulted shows that the freely pollinated fruit was large and symmetrical, while the other was small and one-sided. In the large fruit, too, all the cells developed and bore seeds, while the smaller one had seeds on one side only. This experiment was repeated several times with substantially the same result. From these tests it appears that one-sidedness is due to the greater development of seeds upon the large side; that this increased development of seeds is due to the fact that the greater part of the pollen has been applied on that side; that abundant pollen placed over the entire surface increases the number of seeds and the size of the fruit; and that perhaps the pollen, either directly or indirectly, stimulates the growth of the fruit beyond the mere influence of the number of seeds.

Another interesting section relates to the second crop. The yield from the trained shoots of Tomatoes under glass does not exhaust the vitality of the plant, and, therefore, when the crop is well advanced, one or two new shoots may be trained from near the base to produce a second crop. If the plant is carrying fruit while these shoots are trained, liquid manure should be given once or twice a week, and a fresh mulch of manure may be added. In the dark days of midwinter there is not light enough to make strong shoots, where the planting is close, and it is better, therefore, to delay starting them until the fruit of the first crop is nearly all grown. But late in February or in March the new shoots may be allowed to grow three or four feet long before the old ones are cut away. The stocky shoots, from six inches to a foot long, give fruits as early as weak and slender ones, three or four feet long, and they make better plants. The second crop can be made to follow the first with an interval of from only four to six weeks, although this may be difficult when the planting is close. Another method of obtaining the second crop is to bury the old plants, after the fruit is off, until only a foot or so of the tips projects. The soil which was removed to make a hole into which the plant is coiled down is then filled in and the tip grows the same as a young plant. By this method the yield has not proved quite so heavy as from single shoots, although it is abundant and quite as early. The operation is laborious, and some of the stiffer plants will crack in handling. A third way of obtaining a second crop is by seedling plants which are started from seeds two or three months beforehand, and transplanted two or three times into pots. At the final removing they are taken from four or five inch pots when they are eighteen inches or two feet high and ready to be tied up. Seedlings will bear about the same time as sprouts of equal length to begin with, and the preference, therefore, will

be for sprouts, as the previous labor of sowing and handling is avoided, and, besides this, the seedlings take up valuable room while growing.

Notes.

The double Potentillas, which are now profusely blooming in all shades of orange and red, are showy plants. The flowers last a long time after they are cut as well as on the plants.

Four factories have filed applications in California for bounties on sugar production from beets. One of these, known as the China beet factory, has 4,000 acres planted in beets, and it is expected that the sugar yield will be 5,000,000 pounds.

Mr. Edwin Lonsdale writes to the *American Florist* of a new Rose, a sport from American Beauty, which differs in color from its parent, being a much lighter and more lively pink. The flower becomes lighter with age, but does not show a tendency to the purple shade so often assumed by an off-colored American Beauty. The sport originated with Mr. John Burton, of Philadelphia, and he has just planted a house with the stock for winter-flowering.

One of the most beautiful of climbers is the so-called Prairie Rose (*Rosa setigera*), which is now covered with flowers after the general Rose display is over. This plant is much more beautiful than the double varieties. It is a free grower, and will cover easily a hundred square feet of trellis with its bold, healthy foliage, which is as clean and free from fungi and insects as that of *Rosa rugosa*. The large rose-colored flowers, with conspicuous clusters of yellow stamens, come in corymbs and keep opening one after another for several days.

Monsieur Pasteur long ago expressed the opinion that the bouquet and special qualities of certain wines are due to their particular ferment. This view is supported by Monsieur Jacquemin, who reports some experiments in which he endeavored to impart flavor to barley wine by making it from wort leavened with special ferments of wines of delicate flavor, and found that the sugar-water, in which the ferment was kept, obtained the exact flavor of the various wines used, such as Champagne or Burgundy. He also imparted the flavor of apples and pears by using their ferment in barley wort. The cultivation of particular microbes to furnish any given bouquet to fermented liquors is now in order. It may be, in the future of wine-making, that the quality of the ferment will be considered of more consequence than the quality of the grape.

Agricultural Science contains an account of some European experiments which seem to show that the copper salts so generally used against fungal diseases of the Grape and other plants may be hurtful to vegetation. Certain cereal Grains and Grasses planted in pots were watered with pure water and with water containing copper salts in different proportions, and the dry matter in the harvested plants decreased regularly as the copper salts increased. It was found that the lime and potash in the soil, where copper sulphate was used, formed soluble sulphates, which were washed into the subsoil, while the copper oxide remained at the surface to poison the roots of the plants. The addition of lime to the Bordeaux mixture, of course, lessens the danger of such deterioration. If it is true, as now stated, that weaker solutions of copper salts than those now used are effective as fungicides, the strength should be reduced for other reasons than that of economy.

At the Convention of Nurserymen recently held at Minneapolis, Mr. J. V. Cotta said that the breeding of a race of Apple-trees from seeds gathered from the hardiest known varieties to the manner-born was possible, but it would require a generation before these hardy trees, which yielded late-keeping fruit of good quality, could be produced. He had practiced another method. Under this system varieties too tender for the northwest, when grown by root-grafting or budding, could be produced so that they would endure climatic adversities two or three hundred miles farther north than their profitable range under the old method. This way is to top-graft them, standard-high, on perfectly hardy, free-growing, congenial stocks which have been previously grown by root-grafting; or, in other words, the plan is to double-work the trees. He has practiced this for nine years with entire satisfaction. Of course, double-working means double expense, and often more, but with his present experience he would no more think of planting an orchard of root-grafted or of budded trees of a less hardy strain than the Duchess, even in northern Illinois, than he would of attempting to grow Figs or Oranges there as a commercial venture. In the spring of 1883 he found his root-grafted trees, with a few exceptions, such as the Duchess and some Crab-apples, almost ruined, while top-grafted and double-worked trees of the same sort came out sound to the tip.

A private letter from our correspondent, Monsieur Charles Naudin, written at Antibes, informs us that the beautiful *Sophora secundiflora*, a small tree of western Texas and northern Mexico, introduced into Europe a few years ago through the Arnold Arboretum, has flowered this year for the first time (probably in Europe) in the gardens of the Villa Thuret, and is now ripening its fruit. Among other recent introductions from North America now flourishing in these gardens are *Isomeris arborea*, introduced in 1881, and now flowering and producing fruit abundantly every year; *Pinus cembroides*, *Hicoria myristiciformis*, *Juglans Californica*, *Prosopis juliflora*, *P. pubescens*, *Bumelia lycioides*, introduced in 1880, and now flowering and fruiting every year, *Dasylirion quadrangulare*, *Lupinus arboreus*, *Leucæna pulverulenta*. This last, if it succeeds as well as it does on the banks of the lower Rio Grande, promises to be one of the best shade and ornamental trees that have been planted in southern Europe. Curiously enough, as we learn from our correspondent, *Olneya Tsoota*, the beautiful leguminous tree from Arizona and Sonora, cannot be induced to grow, although the seeds germinate freely enough at Antibes; the seedlings soon become sickly and perish. The same is true of *Pinckneya pubens*, which has been tried on several different occasions at Antibes without success. Three large plants of *Yucca filifera* (see Garden and Forest, vol. i., pp. 78 and 79) were flowering at Antibes on the 20th of June, and had produced panicles more than forty inches long. This, Monsieur Naudin writes, is certainly one of the most important ornamental plants which have been introduced into Europe during the present century.

The Formosa camphor of commerce is obtained from *Laurus Camphora*, of which immense forests cover many of the lower ranges of hills in the island, extending up the lower slopes of the mountains. Many of these forests have not been invaded, and the statement that the camphor supplies in the southern part of the island are becoming exhausted applies only to those districts which are purely Chinese. The supply from other parts of the island is said to be practically inexhaustible; and, even in the districts inhabited by the Chinese, it is only in certain places that the supply is falling off in consequence of the reckless manner in which the trees have been destroyed, partly for the sake of their timber and for camphor, and partly, probably, to clear the ground for cultivation. It has been stated that the method of obtaining crude camphor in Formosa was by steeping the chopped branches in water and then by boiling them until the camphor begins to adhere to the stick used in stirring, when the liquor is strained and the camphor is allowed to harden. By this method it is not necessary to destroy the tree. It may have prevailed formerly, although it certainly does not at present, the yield of camphor from the branches being too small to repay the cost of extraction. A recent British consular report gives some details of the method now in general use. A tree is selected by an expert, who scrapes into the trunk in different places with an instrument resembling a rake, for the purpose of ascertaining if it contains sufficient camphor to repay the cost of extraction. Trees less than fifty years old do not produce camphor in paying quantities, and the yield varies considerably in individual trees. Sometimes one side only of a tree contains sufficient camphor to make extraction profitable, and, in this case, that side alone is attacked. The trunk is scraped as high as the workman can conveniently reach, and the scrapings are pounded and boiled with water in an iron vessel, over which an earthenware jar, made especially for the purpose, is inverted. The camphor condenses on the inner surface of the jar, and is removed from time to time. The root of the tree and the trunk, for some eight feet up, contain the greatest quantity of camphor. If the scrapings obtained from the trunk yield well, the chipping is continued until the tree falls. The roots are then grubbed up and the camphor from them extracted. If the scrapings are not sufficiently productive, the tree is abandoned and work is commenced on another. No effort is made to extract the camphor from the fallen trunk or from the branches. In some cases the trunk, however, is sawed into lumber, but this depends on the locality where the tree is growing. In many districts, owing to the want of roads, the timber would not pay the cost of its transport. It is impossible to imagine a more wasteful method, and it is fortunate that these camphor forests extend over a large part of the islands. Ten of the iron pots in their accompanying jars make up what is called a "set," and are worked by four men. One set will produce about sixty-five pounds in ten days, but this yield is reached only under the most favorable conditions.

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